

Low Profile Tri-Filar, Single Feed, Circularly Polarized Helical Antenna

Abstract

A low-profile, tri-filar, helix antenna having circular polarization (CP) includes a single feed, in the absence of an internal feed network. The antenna includes three metal, bent, quarter-wave monopoles that are physically positioned at 0, 120, and 240 degrees, respectively, on a top flat surface of the antenna. One of the monopoles is directly-fed, and the other two monopoles are parasitically coupled to the directly-fed monopole. Metal perturbations on one or both of the two parasitic monopoles control their coupling-phase to the directly-fed monopole. One of the parasitic monopoles couples at positive 120 degrees to the directly-fed monopole, and the other parasitic monopole couples at negative 120 degrees to the directly-fed monopole. Various perturbation options generate this CP phasing. One of the parasitic monopoles can have a capacitive shunt, and the other parasitic monopole can have a series inductance, or only one parasitic monopole can include a perturbation, either capacitive or inductive, depending on the sense of the CP that is desired. The three

monopoles are supported by a dielectric substrate, or they are free-standing. A ground plane is provided directly under the three monopoles.